



### ■ Features

- DIP 24 package with international standard pinout
- 4:1 wide input range
- Low patient leakage current <math><5\mu\text{A}</math>
- Wide operating temperature range  $-40 \sim +90^{\circ}\text{C}$
- Medical safety approved (2xMOPP) according to IEC60601-1
- Protections: Short circuit (Continuous) / Overload
- 6KVDC or 4.2KVAC high I/O isolation (Reinforced isolation)
- 3 years warranty

### ■ Applications

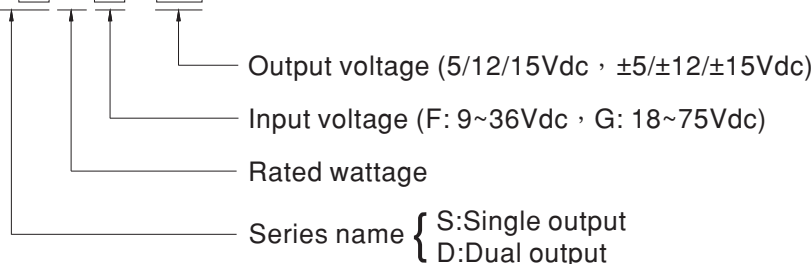
- Medical devices
- Medical oxygen monitor
- CT scanning
- Medical carts
- Oral care equipment
- Industrial control system

### ■ Description

MDS06 and MDD06 series are 6W isolated and regulated module type medical grade DC-DC converter with DIP 24 package. It features international standard pins, a high efficiency up to 84%, wide working temperature range  $-40\sim+90^{\circ}\text{C}$ , 6KVDC or 4.2KVAC I/P-O/P high isolation voltage, compliance with IEC60601-1 medical standard, continuous-mode short circuit protection, etc. The models account for different input voltage 9~36V and 18~75V 4:1 wide input range, and various output voltage, 5V/12V/15V for single output and  $\pm 5\text{V}/\pm 12\text{V}/\pm 15\text{V}$  for dual output. Which are suitable for medical systems, ultra low leakage current.

### ■ Model Encoding

**MD S 06 F - 12**





6W DIP Package DC-DC Medical Grade Regulated Converter **MDS06 & MDD06 series**

MODEL SELECTION TABLE							
ORDER NO.	INPUT			OUTPUT		EFFICIENCY (TYP.)	CAPACITOR LOAD (MAX.)
	INPUT VOLTAGE (RANGE)	INPUT CURRENT		OUTPUT VOLTAGE	OUTPUT CURRENT		
		NO LOAD	FULL LOAD				
MDS06F-05	Normal 12V,24V (9 ~ 36V)	20mA	625mA	5V	0 ~ 1200mA	80%	330μF
MDS06F-12		22mA	620mA	12V	0 ~ 500mA	81%	120μF
MDS06F-15		20mA	602mA	15V	0 ~ 400mA	83%	100μF
MDD06F-05		20mA	625mA	±5V	±60 ~ 600mA	80%	*330μF
MDD06F-12		28mA	617mA	±12V	±25 ~ 250mA	81%	*47μF
MDD06F-15		30mA	612mA	±15V	±20 ~ 200mA	82%	*47μF
MDS06G-05	Normal 24V,48V (18 ~ 75V)	10mA	315mA	5V	0 ~ 1200mA	80%	330μF
MDS06G-12		12mA	305mA	12V	0 ~ 500mA	84%	120μF
MDS06G-15		12mA	300mA	15V	0 ~ 400mA	84%	100μF
MDD06G-05		10mA	313mA	±5V	±60 ~ 600mA	80%	*330μF
MDD06G-12		15mA	315mA	±12V	±25 ~ 250mA	81%	*47μF
MDD06G-15		15mA	310mA	±15V	±20 ~ 200mA	82%	*47μF

\* For each output

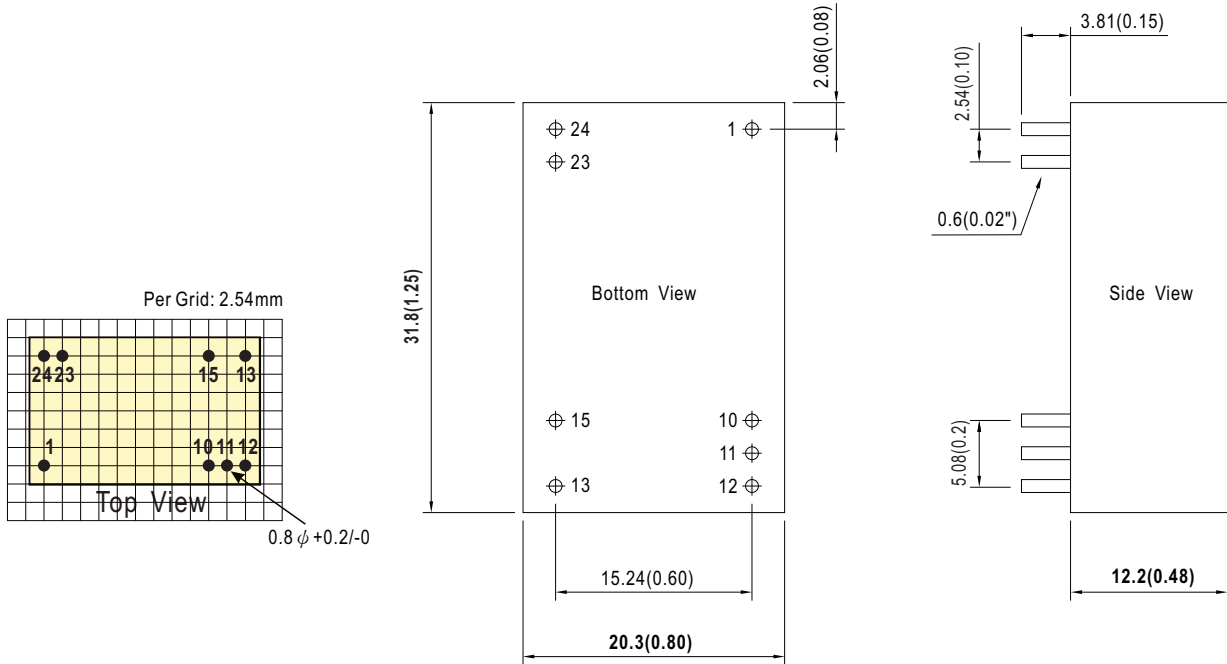


# 6W DIP Package DC-DC Medical Grade Regulated Converter **MDS06 & MDD06** series

SPECIFICATION				
INPUT	VOLTAGE RANGE	F: 9 ~ 36Vdc , G: 18 ~ 75Vdc		
	SURGE VOLTAGE (100ms max.)	F models : 50Vdc ; G models : 100Vdc		
	FILTER	Pi type		
	PROTECTION (Typ.)	Fuse recommended. F models: 2A slow-blow Type, G models: 1A slow-blow Type		
OUTPUT	VOLTAGE ACCURACY	±2%		
	RATED POWER	6W		
	RIPPLE & NOISE Note.2	100mVp-p		
	LINE REGULATION Note.3	±0.5%		
	LOAD REGULATION Note.4	±0.5%		
	SWITCHING FREQUENCY (Typ.)	280KHz		
PROTECTION	SHORT CIRCUIT	Protection type : Continuous, automatic recovery		
	OVERLOAD	110 ~ 250% rated output power Protection type : Recovers automatically after fault condition is removed		
ENVIRONMENT	COOLING	Free-air convection		
	WORKING TEMP.	-40 ~ +90°C (Refer to "Derating Curve")		
	CASE TEMPERATURE	+105°C max.		
	WORKING HUMIDITY	20% ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-55 ~ +125°C, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	0.05% / °C (0 ~ 71°C)		
	SOLDERING TEMPERATURE	1.5mm from case of 3 ~ 5sec./265°C max.		
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes		
SAFETY & EMC (Note.5)	SAFETY STANDARDS	IEC60601-1(LVD) 3 <sup>rd</sup> edition, EAC TP TC 020/2011(EAC TP TC 004 for 48Vin type only) approved		
	WITHSTAND VOLTAGE	I/P-O/P:6KVDC or 4.2KVAC		
	ISOLATION RESISTANCE	I/P-O/P:1000M Ohms / 500VDC / 25°C / 70% RH		
	ISOLATION CAPACITANCE (Typ.)	20pF		
	ISOLATION LEVEL	Primary-secondary: 2xMOPP when system input voltage is with 250VAC, 50/60Hz		
	EMC EMISSION	Parameter	Standard	Test Level / Note
		Conducted	BS EN/EN55011	N/A
		Radiated	BS EN/EN55011	Class A without external components
	EMC IMMUNITY	Parameter	Standard	Test Level / Note
		ESD	BS EN/EN61000-4-2	± 15KV air
		Radiated Susceptibility	BS EN/EN61000-4-3	10V/m
		EFT/Burest	BS EN/EN61000-4-4	± 2KV
		Surge	BS EN/EN61000-4-5	± 2KV Line-Line
Conducted		BS EN/EN61000-4-6	10Vrms(e.m.f.)	
Magnetic Field		BS EN/EN61000-4-8	30A/m	
OTHERS	MTBF	>454Khrs MIL-HDBK-217F(25°C)		
	DIMENSION (L*W*H)	31.8*20.3*12.2mm (1.25*0.8*0.48 inch)		
	CASE MATERIAL	UL94V-0 plastic case		
	PACKING	17g ; 15pcs/per tube, 750pcs/50 tube max./carton		
NOTE	<p>1.All parameters are specified at normal input(F: 12Vdc, G: 24Vdc), rated load, 25°C 70% RH ambient.</p> <p>2.Ripple &amp; noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1µf &amp; 47µf capacitor.</p> <p>3.Line regulation is measured from low line to high line at rated load.</p> <p>4.Load regulation is measured from 10% to 100% rated load for MDD06.</p> <p>5.The final equipment must be re-confirm that it still meet EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies."(as available on <a href="http://www.meanwell.com">http://www.meanwell.com</a>)</p> <p>※ Product Liability Disclaimer : For detailed information, please refer to <a href="https://www.meanwell.com/serviceDisclaimer.aspx">https://www.meanwell.com/serviceDisclaimer.aspx</a></p>			

**Mechanical Specification**

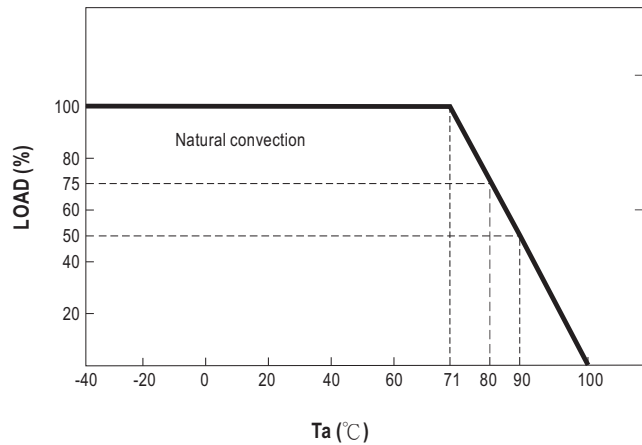
- All dimensions in mm(inch)
- Tolerance: x.x or x.xx±0.5mm(x.xx±0.02")
- Pin size is: 0.6±0.10mm (0.02" ±0.004")



**Plug Assignment**

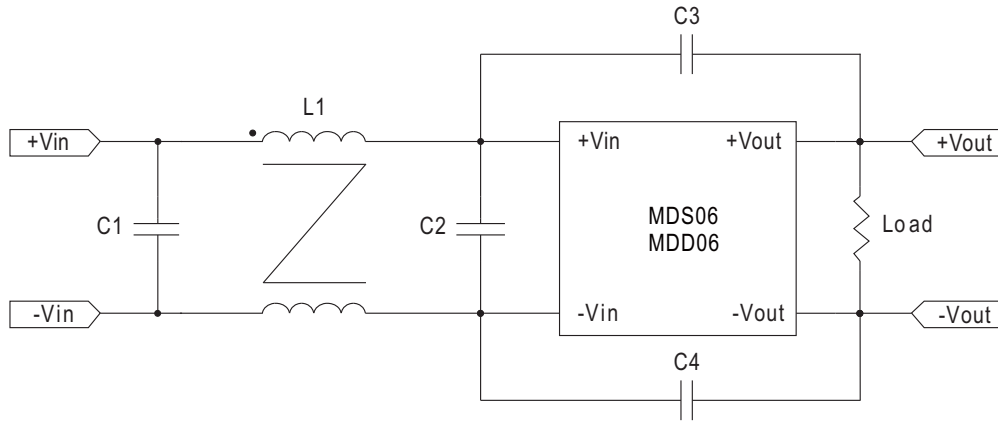
Pin-Out		
Pin No.	MDS06 (Single output)	MDD06 (Dual output)
1	+Vin	+Vin
10	No pin	No pin
11	No pin	Common
12	-Vout	No pin
13	+Vout	-Vout
15	No pin	+Vout
23,24	-Vin	-Vin

**Derating Curve**



■ **EMC Suggestion Circuit**

※Required external components to meet BS EN/EN55011 class B emission are as below:



	C1	C2	C3	C4	L1
MDS06F	10 $\mu$ F/50V MLCC	10 $\mu$ F/50V MLCC	X	X	450 $\mu$ H Common Mode Choke
MDS06G	4.7 $\mu$ F/100V MLCC	4.7 $\mu$ F/100V MLCC	X	X	450 $\mu$ H Common Mode Choke

■ **Installation Manual**

Please refer to : <http://www.meanwell.com/manual.html>